DOCUMENT RESUME

ED 460 293 CE 082 779

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TITLE Differences in Adaptive Competency Acquisition between Traditionally Certified and Alternatively Certified Technology Education Teachers.
PUB DATE 2001-12-15
NOTE 15p.; Paper presented at the Annual Conference of the Association for Career and Technical Education (75th, New Orleans, LA, December 13-16, 2001).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Alternative Teacher Certification; Bachelors Degrees; *Creative Thinking; Educational Research; Higher Education; *Industrial Arts Teachers; Intuition; Knowledge Base for Teaching; Problem Solving; Secondary Education; *Teacher Competencies; *Teacher Education; Teacher Qualifications; *Technology Education

ABSTRACT

A study determined whether there are any differences in the adaptive competency acquisition between technology education teachers who have completed a school district add-on alternative certification process and technology education teachers who completed a traditional baccalaureate degree certification program. Non-probability sampling was used for the study. The sample consisted of two groups: 5 teachers certified in other areas who had completed a midwest school district's add-on alternative certification program for technology education and 10 technology education teachers with two or less years experience who had graduated from the same midwest state's land-grant university. The district's add-on model consisted of 80 hours of instruction related to the technical content of the technology education field and was conducted by school district personnel. Teachers were mailed the Adaptive Competency Profile (ACP) and a demographic assessment. Four alternatively certified teachers and six traditionally certified teachers responded. Findings indicated that overall alternatively certified teachers possessed higher levels of adaptive competency acquisition. This would indicate these teachers can perform intuitive reasoning tasks more effectively and that they effectively developed problem-solving and practical application tasks, as well as people-orientated skills. (Contains 23 references.) (YLB)

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ED 460 293

Differences in Adaptive Competency Acquisition Between Traditionally Certified and Alternatively Certified Technology Education Teachers

A Research Paper
Present at the
Association for Career and Technical Education Conference
New Orleans, LA
December 15, 2001

by

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With the national shortage of technology education teachers projected to intensify, the alternative certification of technology education teachers looms as an increasingly likely option for school administrators (Weston, 1997). Numerous studies have been conducted as to the effectiveness of alternative certification programs compared to traditional certification of teachers. These studies have focused on tangible factors and the background of the participants, with little examination as to their readiness to manage the complexities of the technology education classroom (Litowitz, 1998).

Alternative teacher certification is defined as teacher education that departs significantly from traditional teacher education programs (Oliver & McKibbin, 1985). This certification process has been a focus of many educational reform discussions, attempting to improve teacher quality and reduce teacher shortage (Dial & Stevens, 1993; Hutton, Lutz & Williamson, 1990). Ereckson and Barr (1985) expressed concerns about the limited research exploring the instructional effectiveness of alternative certified teachers compared to their counterparts who completed a four-year teacher education program. Brown, Edington, Spencer, and Tinafero (1989) suggested that research should be conducted to compare traditionally and alternatively certified teachers identifying what differences, if any, exist. As observed by Shoho and Martin (1999), little is known about what alternative certified teachers' experience in their work environment.

In an attempt to develop a base of understanding related to alternative certification, Truell (1999) explored levels of concern in career and technical educators. These levels of concern focus on seven categories: human relations, classroom management, instructional activities, personal concerns, work conditions, evaluation and professional growth. The outcome of his research suggested that concerns by both certification types were task oriented

in nature. There was limited discussion related to differences in the essence of teaching: intuitive and inductive reasoning, practical skills, and people-oriented tasks. These attributes are known as adaptive competencies.

Types of alternative certification programs are varied. Litowitz (1998) noted that alternative methods included suitable background model, graduate model, strand licensure model, military career transition model, life experience model, and the add-on model. Litowitz went on to note, "all of these alternative licensure models can provide the advantage of generating greater numbers of teachers, but some models may have inherent weaknesses in terms of quality teacher preparation" (p. 28). Otuya (1992) indicated that subject matter expertise alone is an inadequate foundation for instruction because teaching requires the transformation of content into situations that enhance a student's learning. Whiting and Klotz (1999) concurred, noting that alternative certification programs that prepare individuals who currently possess the content knowledge, but enter the teaching profession without pedagogical skills, are ineffective teachers.

For this study, technology education teachers certified through the add-on licensure model will be examined for adaptive competency acquisition. The add-on model is an option for teachers with a teaching certificate in a discipline other than technology education (Litowitz, 1998). The teacher is then provided training related to the technical content of technology education. One advantage of this model is that the individuals already have experience related to pedagogical skills and classroom management. However, can these skills from an academic classroom transfer to a technology education laboratory environment?

Conceptual Framework

Kolb's Experiential Learning Theory (1976) formed the basic tenets for the conceptual framework of this study. This model was chosen because of its usefulness in determining competency acquisition (Laschinger, 1992). Kolb's view of learning is centered on the assumption that learning does not occur in isolation, but through personal-environmental interactions: interactions, which extend beyond formal learning situations into life-long personal and work experiences (Kolb; Smith & Kolb, 1986; Ridley, Laschinger, & Goldenberg, 1995). Learning is conceptualized as a cycle that can be summarized through three central concepts: learning styles, adaptive competencies, and environmental press perceptions (Kolb; Smith & Kolb). Learning styles, the first area, are the means by which an individual processes information. Adaptive competencies, the second area, are the skills required to effectively complete a particular task. Environmental press perceptions, the third area, are the learners' views of their competency acquisition. Thus, the acquisition of adaptive competencies served as the conceptual framework of this study.

Adaptive competencies are the skills required to effectively complete a particular task and are the congruencies (balance) between personal skills and task demands (Kolb, 1984; Ridley, et al., 1995). These adaptive competencies are:

> **Accommodative adaptive competencies** are the skills required to effectively complete intuitive reasoning tasks, including the following abilities: committing yourself to objectives, influencing and leading others, dealing with people, seeking and exploiting opportunities and being personally involved.

> **Assimilative adaptive competencies** are the skills required to effectively complete inductive reasoning tasks, including the following abilities: building conceptual

models, designing experiments, organizing information, analyzing quantitative data and testing theories and ideas.

Convergent adaptive competencies are the skills required to effectively complete problem solving and practical application tasks, including the following abilities: making decisions, generating alternate ways to do thin-s, experimenting with new ideas and approaches, choosing the best solution and setting goals.

Divergent adaptive competencies are skills required to effectively complete people-oriented tasks, including the following abilities: listening with an open mind, being sensitive to values, imaging implications of situations and being sensitive to people's feelings (Kolb, 1976; Fry, 1981; Kolb; Ridley, et al.).

Purpose

The purpose of this study was to determine if there are any differences in the adaptive competency acquisition between technology education teachers that have completed a school district add-on alternative certification process and technology education teachers who completed a traditional baccalaureate degree certification program. This comparison should provide school district administrators and teacher educators with additional data regarding the effectiveness of this type of alternative certification process in preparing technology education teachers.

This study explored the following four research questions:

Research Question Number 1:

Is there a significant difference between the accommodative adaptive competencies developed by traditionally certified and alternatively certified technology education teachers as measured by the Adaptive Competency Profile?

Research Question Number 2:

Is there a significant difference between the assimilative adaptive competencies developed by traditionally certified and alternatively certified technology education teachers as measured by the Adaptive Competency Profile?

Research Question Number 3:

Is there a significant difference between the convergent adaptive competencies developed by traditionally certified and alternatively certified technology education teachers as measured by the Adaptive Competency Profile?

Research Question Number 4:

Is there a significant difference between the divergent adaptive competencies developed by traditionally certified and alternatively certified technology education teachers as measured by the Adaptive Competency Profile?

Laschinger (1992) assessed student achievement related to competency acquisition in the field of nursing through adaptation of the Adaptive Competency Profile (ACP). The ACP is an alternate measure of learning style in which participants rate their achievement level on each of the tool's competency questions, using a seven-point Likert-type scale. The items were generated by Kolb and a panel of experts in the fields of engineering and social work in 1981, representing specific competencies characteristic of each of the four modes of learning espoused in Kolb's learning theory (Fry, 1981). These items were intended to be generic enough to be useful in describing learning orientations of individuals in a variety of disciplines (Kolb, 1984). The ACP items are used to calculate a personal profile of adaptive competencies. Mean scores on the four competencies indicate the individual's achievement in that area (Sims, 1983).

To calculate the mean scores for each of the four adaptive competencies, the five ACP items for that competency are tabulated and then this sum divided by five. This process places the resulting means back into a Likert-type scale range of 1-7, with one being unskilled and seven being highly skilled. Only 20 items of the 34-item ACP assessment tool are calculated, the remaining 14 items serve as distracters. Kolb (1984) reported alpha reliability estimates for the subscales between 0.67 and 0.82.

The fields of nursing education and technology teacher education share learning components. These shared components are documented in *Elements and Structure for a Model Undergraduate Technology Teacher Education Program* (Henak, 1991) and *NLN Guide to Undergraduate Education* (National League for Nursing, 1995). The similarities between undergraduate nursing and technology education curricula include 1) emphasis on the sciences, 2) interpersonal skills, 3) clinical/field experiences, and 4) preparation for a professional licensure examination.

Based on the common emphasis in the sciences, both nursing education and technology teacher education programs prepare their graduates with the ability to link scientific knowledge/skill with the interpersonal requirements of the profession. This convergence of intuitive and inductive reasoning, problem solving abilities, and interpersonal skills form the foundations of clinical reasoning for these professions. This research utilized the ACP that was validated previously in nursing education programs by Coyle-Rogers (2001) and Laschlinger (1992) to assess the effectiveness of technology teacher education models, both tradtional and alternative.

Methodology

Non-probability sampling was used for this study. The sample consisted of two groups; five teachers that had completed a Midwest school district's add-on alternative certification program for technology education and ten technology education teachers with two or less years experience that had graduated from the same Midwest state's land-grant university. The district's add-on model consisted of 80 hours of instruction related to the technical content of the technology education field and was conducted by school district personnel.

This sample of technology teachers from both models of teacher preparation was mailed the ACP and a demographic assessment. The results provided both individual ACP scores and group, alternatively certified and traditionally certified, ACP means from the individual Likert-type scale responses. For statistical purposes, the ACP subscales means were compared to determine adaptive competency acquisition. Since this research study involved two samples, the t test for independent samples was utilized for statistical analysis (Polit & Hungler, 1991).

The response rate was 80% (n = 4) for the alternatively certified technology education teachers and 60% (n = 6) for the traditionally certified teachers. The alternatively certified technology education teachers averaged 50 years of age and were initially certified to teach special education, foreign language, and health science. The traditionally prepared technology education teachers averaged 24 years of age with two years of teaching experience. Seventy-five percent (n = 3) of the alternatively certified teachers and 33% (n = 2) of the traditionally certified technology teachers were female.

Findings

Findings from this study indicated that overall the adaptive competency acquisition of the alternatively certified technology education teachers was higher than the adaptive competency acquisition of the traditionally certified technology education teachers. The acquisition of accommodative adaptive competencies was 6.2 for the alternately certified teachers and 5.3 for the traditionally prepared teachers. This difference was significantly greater for the alternatively certified teachers when compared to the traditionally prepared technology education teachers ($t = 2.582$). Assimilative adaptive competency acquisition was only slightly higher for alternatively certified teachers ($M = 5.2$) than their traditionally prepared counterparts ($M = 5.1$). Both the convergent and divergent adaptive competencies were higher for the alternately certified sample ($M = 6.0$; $M = 5.7$) than the technology teachers who had completed a university-based traditional program ($M = 5.4$; $M = 5.5$). The ACP of the two groups can be seen in Table 1.

Table 1

Adaptive Competency Profiles

	TC		AC			
ACP	M	SD	M	SD	df	t
Accommodative	5.3	.548	6.2	.443	8	2.582 *
Assimilative	5.1	.865	5.2	.283	8	1.737
Convergent	5.4	.858	6.0	.432	8	1.291
Divergent	5.5	.548	5.7	.383	8	1.979

*$p < .05$.

Significantly higher accommodative adaptive competency acquisition scores would indicate that these alternatively certified technology education teachers can perform intuitive reasoning tasks more effectively than the traditionally prepared teachers. Higher scores by the alternately certified teachers in relationship to the acquisition of convergent and divergent skills indicated that these teachers effectively developed problem-solving and practical application tasks, as well as people-orientated skills. Similar assimilative adaptive competency acquisition scoring between the two technology education teacher groups indicated that inductive reasoning tasks were acquired regardless of the certification program structure.

The result indicating a significantly higher accommodative ACP by the alternatively certified teachers was similar to the finding by Shoho and Martin (1999) who reported significantly lower levels of isolation by alternatively certified teachers. Higher acquisition scores in convergent and divergent tasks support the work of Truell (1999) who also noted that alternatively certified teachers indicated lower levels of human relations concerns than traditionally prepared teachers.

Implications

The findings from this study indicated that overall alternatively certified technology education teachers possessed higher levels of adaptive competency acquisition than the sampled traditionally certified technology education teachers. The difference was significant in the accommodative adaptive competency ($t = 2.582$). These findings could indicate that these alternatively prepared teachers were able to adapt and successfully manage the environment of the technology education laboratory. However, this difference may have resulted from the distinct difference in age and classroom experience between the two samples.

While this study only focused on the adaptive competency acquisition, this is only one facet of comparison between the two types of certification of technology education teachers. This study did not examine the technical competency of the alternatively certified technology education teachers. A follow-up study should be conducted to assess whether or not the alternatively certified teachers possess the technical competency to be effective technology education teachers.

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